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BLUESTONE RESERVOIR, MERCER, MONROE, AND SUMMERS COUNTIES, WEST VIRGINIA AND GILES COUNTY, VIRGINIA

PACIFIC NORTHWEST ENVIRONMENTAL RESEARCH LABORATORY

PREPARED FOR
NATIONAL ENVIRONMENTAL RESEARCH CENTER

JUNE 1975

PB 252 056

U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY

WORKING PAPER SERIES

REPORT

ON

BLUESTONE RESERVOIR
MERCER, MONROE, AND SUMMERS COUNTIES,
WEST VIRGINIA
AND
GILES COUNTY, VIRGINIA

EPA REGION III

WORKING PAPER No. 467

PACIFIC NORTHWEST ENVIRONMENTAL RESEARCH LABORATORY

An Associate Laboratory of the

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and

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REPORT

ON

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WORKING PAPER No. 467

WITH THE COOPERATION OF THE

WEST VIRGINIA DEPARTMENT OF NATURAL RESOURCES

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16. ABSTRACT
Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivded according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during one year study of the lake and its tributaries are included in the report.

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CONTENTS

	Page
Foreword	ii
List of West Virginia Study Lakes	iv
Lake and Drainage Area Map	v
Sections	
I. Conclusions	1
II. Lake and Drainage Basin Characteristics	4
III. Lake Water Quality Summary	5
IV. Nutrient Loadings	9
V. Literature Reviewed	18
VI. Appendices	19

FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to fresh water lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's fresh water lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the West Virginia Department of Natural Resources for professional involvement and to the West Virginia National Guard for conducting the tributary sampling phase of the Survey.

Ira S. Latimer, Jr., Director of the Department of Natural Resources; and John H. Hall, Chief of the Water Resources Division; and the Water Resources Division staff provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports, and provided critiques most useful in the preparation of this Working Paper series.

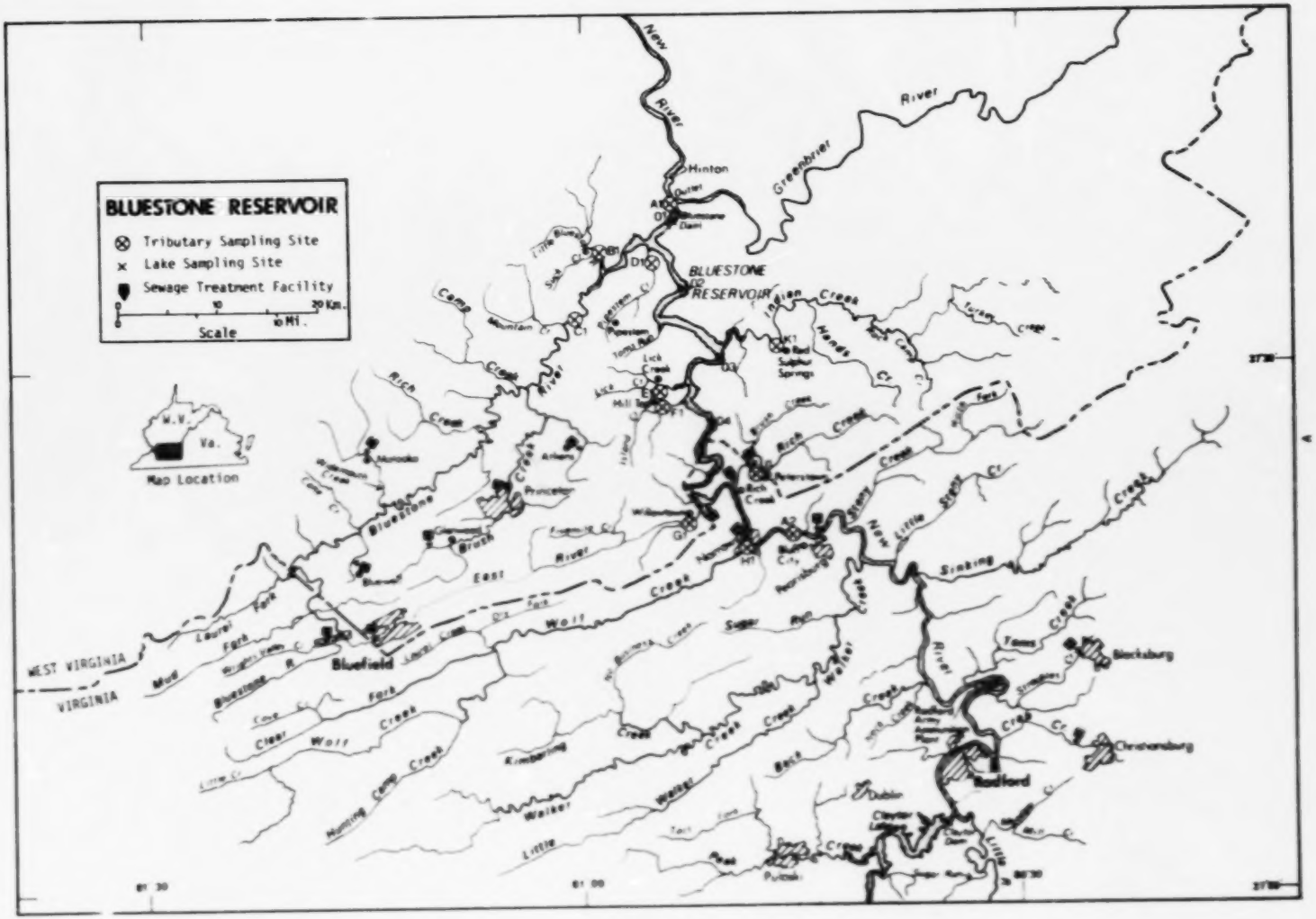
Major General Jack W. Blair, the Adjutant General of West Virginia, and Project Officer Major Manuel G. Goble, who directed the volunteer efforts of the West Virginia National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF WEST VIRGINIA

LAKE NAME	COUNTY
Bluestone	Mercer, Monroe, Summers, WV; Giles, VA
Lynn	Monongalia
Summersville	Nicholas
Tygart	Barbour, Taylor


BLUESTONE RESERVOIR
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
Scale
Map Location
W.V.
Va.
BLUESTONE RESERVOIR
New River
Greenbrier River
Hinton
Bluefield
WEST VIRGINIA
VIRGINIA
Radford
Blacksburg
Christiansburg
Dublin
Pulaski

BLUESTONE RESERVOIR

STORET NO. 5401

I. CONCLUSIONS

A. Trophic Condition:

Survey data indicate that Bluestone Reservoir is eutrophic. It ranked last in overall trophic condition when the four West Virginia lakes sampled in 1973 were compared using a combination of six parameters*. None of the other lakes had greater median total phosphorus, median dissolved phosphorus, median inorganic nitrogen, or mean chlorophyll a; and all of the other lakes had greater mean Secchi disc transparency. Depression of dissolved oxygen with depth occurred at sampling station 1 in July and September.

Survey limnologists noted an algal bloom in progress at three of the four sampling stations in September.

B. Rate-Limiting Nutrient:

The algal assay results indicate that Bluestone Reservoir was limited by phosphorus at the time the sample was taken (04/03/73). The lake data indicate phosphorus limitation at all sampling stations and times.

C. Nutrient Controllability:

1. Point sources--The phosphorus contributions of known point sources accounted for 40.9% of the total load reaching Bluestone Reservoir during the sampling year. The major contributors were Blacksburg, 8.6%; Bluefield (two plants), 7.4%; Princeton, 6.0%;

* See Appendix A.

Radford, 5.1%; and Christiansburg, 3.4%. The remaining 14 facilities collectively contributed 10.7% of the total.

The present phosphorus loading of 32.05 $g/m^2/yr$ is more than six times that proposed by Vollenweider (Vollenweider and Dillon, 1974) as a eutrophic loading (see page 17). However, Vollenweider's model probably is not applicable to water bodies with short hydraulic retention times, and the mean hydraulic retention time of the reservoir is a very short three days.

It is calculated that even complete removal of point-source phosphorus would still leave a loading of 18.94 $g/m^2/yr$, or nearly four times a eutrophic loading. However, in view of the questionable applicability of the model and the phosphorus-limited condition of the reservoir, it is likely that phosphorus control at all of the point sources in the drainage would at least reduce the incidence and severity of nuisance algal blooms.

Bluestone Reservoir received a very high nitrogen loading of 933 $g/m^2/yr$, and about 34% of that load was contributed by the Radford Army Ammunition Plant. In a previous study it was found that although the waste discharges from the plant caused localized damage to the flora and fauna of New River, the river had recovered within about eight stream kilometers (Cairns and Dickson, 1973). The discharges do contribute to the relatively high nitrogen levels in the reservoir; but since the primary productivity of the reservoir is phosphorus limited, reduction of nitrogen inputs would not be expected to improve the trophic condition.

2. Non-point sources--Non-point-source phosphorus contributions amounted to 58.2% of the total input to the reservoir during the sampling year. New River contributed 45.5%, Bluestone River contributed 5.9%, and the remaining eight tributaries collectively contributed 6.6% of the total. The ungaged tributaries were estimated to have contributed 0.9% of the total load.

Rich Creek had an apparent phosphorus export rate of 37 $kg/km^2/yr$ which is much higher than the rates of the other Bluestone Reservoir tributaries (see page 16). This may be due to underestimation of the contribution of the Red Sulphur PSD wastewater treatment plant at Peterstown or to unidentified point sources either in the urban area or the upstream drainage.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS†

A. Lake Morphometry††:

1. Surface area: 8.25 kilometers^2.
2. Mean depth: 5.8 meters.
3. Maximum depth: 12.2 meters.
4. Volume: 47.850 x 10^6 m^3.
5. Mean hydraulic retention time: 3 days (based on outlet flow).

B. Tributary and Outlet:
(See Appendix C for flow data)

1. Tributaries -

Name	Drainage area (km^2)*	Mean flow (m^3/sec)*
New River	9,039.1	132.1
Little Bluestone River	89.9	1.4
Bluestone River	940.2	12.6
Pipestem Creek	51.8	0.8
Lick Creek	55.4	0.9
Island Creek	36.0	0.6
East River	197.1	1.5
Wolf Creek	577.6	8.1
Rich Creek	131.1	1.1
Indian Creek	479.1	3.6
Minor tributaries & immediate drainage -	318.9	4.5
Totals	11,916.2	167.2

2. Outlet -

New River	11,924.4**	159.9

C. Precipitation***:

1. Year of sampling: 124.4 centimeters.
2. Mean annual: 111.2 centimeters.

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† Table of metric equivalents--Appendix B.
†† Robinson, 1974.
* For limits of accuracy, see Working Paper No. 175, "...Survey Methods, 1973-1976".
** Includes area of lake.
*** See Working Paper No. 175.

III. LAKE WATER QUALITY SUMMARY

Bluestone Reservoir was sampled three times during the open-water season of 1973 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from four stations on the reservoir and from one or more depths at each station (see map, page v). During each visit, a single depth-integrated (4.6 m or near bottom to surface) sample was composited from the stations for phytoplankton identification and enumeration; and during the first visit, a single 18.9-liter depth-integrated sample was composited for algal assays. Also each time, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 11.0 meters at station 1, 4.6 meters at station 2, 1.2 meters at station 3, and near-surface only at station 4.

The sampling results are presented in full in Appendix D and are summarized in the following table.

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR BLUESTONE RESERVOIR
STORET CODE 5401

PARAMETER	1ST SAMPLING (4/ 3/73) 4 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (7/18/73) 2 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (9/26/73) 4 SITES RANGE	MEAN	MEDIAN
TEMP (C)	12.1 - 12.7	12.5	12.5	23.7 - 26.4	24.9	24.8	21.7 - 25.3	23.8	23.8
DISS OXY (MG/L)	9.5 - 11.2	9.9	9.6	4.3 - 7.8	6.3	6.2	3.2 - 10.8	8.2	9.0
CNDCTVY (MCROMO)	120. - 140.	131.	130.	144. - 189.	167.	171.	155. - 226.	187.	181.
PH (STAND UNITS)	7.0 - 8.0	7.7	7.9	7.4 - 7.8	7.7	7.8	7.5 - 9.5	8.5	8.6
TOT ALK (MG/L)	41. - 47.	44.	43.	50. - 66.	55.	56.	54. - 76.	65.	64.
TOT P (MG/L)	0.068 - 0.096	0.080	0.077	0.056 - 0.078	0.068	0.069	0.035 - 0.102	0.069	0.069
ORTHO P (MG/L)	0.014 - 0.019	0.017	0.017	0.020 - 0.029	0.025	0.025	0.008 - 0.030	0.018	0.018
NO2+NO3 (MG/L)	0.880 - 1.000	0.939	0.920	0.660 - 1.200	1.040	1.100	0.480 - 2.700	1.227	1.095
AMMONIA (MG/L)	0.070 - 0.100	0.087	0.090	0.070 - 0.340	0.127	0.100	0.040 - 0.430	0.100	0.045
KJEL N (MG/L)	0.200 - 0.500	0.389	0.400	0.200 - 0.600	0.271	0.200	0.300 - 0.800	0.510	0.500
INORG N (MG/L)	0.960 - 1.090	1.026	1.010	1.000 - 1.270	1.167	1.200	0.440 - 2.740	1.327	1.210
TOTAL N (MG/L)	1.120 - 1.490	1.328	1.310	1.120 - 1.400	1.311	1.300	0.930 - 3.200	1.737	1.575
CHLRPYL A (UG/L)	1.2 - 2.1	1.6	1.6	10.8 - 41.9	26.3	26.3	20.5 - 26.2	22.4	21.5
SECCHI (METERS)	0.4 - 0.5	0.4	0.5	0.4 - 0.9	0.6	0.6	0.9 - 0.9	0.9	0.9

B. Biological characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units per ml
04/03/73	1. Navicula sp.	74
	2. Synedra sp.	63
	3. Cymbella sp.	35
	4. Flagellates	26
	5. Gomphonema sp.	24
	Other genera	128
	Total	350
07/18/73	1. Fragilaria sp.	409
	2. Flagellates	170
	3. Stephanodiscus sp.	68
	4. Oscillatoria sp.	68
	5. Coelastrum sp.	34
	Other genera	103
	Total	852
09/26/73	1. Aphanizomenon (?) sp.	1,851
	2. Stephanodiscus sp.	1,562
	3. Flagellates	1,157
	4. Cyclotella sp.	636
	5. Scenedesmus sp.	609
	Other genera	1,503
	Total	7,318

2. Chlorophyll a -

Sampling Date	Station Number	Chlorophyll a (µg/l)
04/03/73	01	1.2
	02	1.8
	03	1.5
	04	2.1
07/18/73	01	41.9
	02	10.8
	03	-
	04	-
09/26/73	01	26.2
	02	21.5
	03	21.5
	04	20.5

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.015	0.915	4.3
0.050 P	0.065	0.915	21.1
0.050 P + 1.0 N	0.065	1.915	23.0
1.0 N	0.015	1.915	6.3

2. Discussion -

The control yield of the assay alga, Selenastrum capricornutum, indicates that the potential primary productivity of Bluestone Reservoir was moderately high at the time the sample was taken. Also, a five-fold increase in yield with the addition of orthophosphorus alone indicates that the reservoir was limited by phosphorus at that time. Note that the addition of nitrogen alone resulted in a yield not significantly different than that of the control.

The lake data substantiate phosphorus limitation; i.e., the mean inorganic nitrogen/orthophosphorus ratios were 35/1 or greater at all sampling stations and times.

IV. NUTRIENT LOADINGS
(See Appendix E for data)

For the determination of nutrient loadings, the West Virginia National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page v), except for the high runoff months of February and March when two samples were collected. Sampling was begun in July, 1973, and was completed in June, 1974.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the West Virginia District Office of the U.S. Geological Survey for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a U.S. Geological Survey computer program for calculating stream loadings*. Nutrient loads shown are those measured minus point-source loads, if any.

Nutrient loads for unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated using the means of the nutrient loads, in $kg/km^2/year$, at stations B-1, D-1, E-1, and F-1 and multiplying the means by the ZZ area in km^2.

The operators of the Athens, Bluefield, Pearisburg, Princeton, Radford Army Ammunition Plant, and Red Sulphur PSD wastewater treatment plants provided monthly effluent samples and corresponding flow data.

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* See Working Paper No. 175.

The operators of the plants serving the Appalachian Power Company, Glenwood PSD, and Rich Creek submitted monthly effluent samples but few or no flow data; and Blacksburg, Bluewell PSD, Christiansburg, Matoaka, Narrows, and Radford did not participate in the Survey. Nutrient loads from these sources were estimated at 1.134 kg P and 3.401 kg N/capita/year, and flows were estimated at 0.3785 m^3/capita/day.

A. Waste Sources*:

1. Known domestic -

Name	Pop. Served	Treatment	Mean Flow (m^3/d)	Receiving Water
Blacksburg	20,000	trickling filter	7,570.0	Stroubles Creek
Christiansburg	7,857	trickling filter	2,973.9	Crab Creek
Radford	12,000	prim. clarifier	4,542.0	New River
Radford Army Amm. Plt.	4,000	trickling filter	1,695.7	New River
Pearisburg	3,000	Imhoff	1,011.7	New River
Narrows	3,000	prim. clarifier	1,135.5	Wolf Creek
Rich Creek	725	Imhoff	274.4	Rich Creek
Red Sulphur PSD (Peters-town)	1,800	trickling filter	642.3	Rich Creek
Appalachian Power Co.	150	act. sludge	56.8	New River
Bluefield -				
East Plant	4,300	trickling filter	1,187.0	East River
West Plant	19,000	trickling filter	8,368.7	Bluestone River
Athens**	1,200	act. sludge	900.6	Brush Creek
Glenwood PSD -				
AB	2,200	pond	832.7	Brush Creek
C	800	pond	302.8	Brush Creek
G-1	320	pond	121.1	Brush Creek
G-2	240	pond	90.8	Brush Creek
H	220	pond	83.3	Brush Creek
Princeton	12,000	trickling filter	7,018.8	Brush Creek
Bluewell PSD	1,200	trickling filter	454.2	Bluestone River
Matoaka	800	oxid. ditch	302.8	Widemouth Cr.

* Anonymous, 1971; Gregory, 1973; treatment plant questionnaires.
** Population increases to 2,900 during college season.

2. Known industrial -

Name	Product	Treatment	Mean Flow (m^3/d)	Receiving Water
Radford Army Amm. Plant -				
AB-line	nitro-cellulose	?	47,603.9	New River
C-line	sulfuric acid	?	4,102.9	New River
TNT plant	TNT	?	15,614.8	Stroubles Creek
Celanese Fibers Co., Narrows	cellulose acetate	ext. aer.	?	New River

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/ yr	% of total
a. Tributaries (non-point load) -		
New River	120,420	45.5
Little Bluestone River	530	0.2
Bluestone River	15,665	5.9
Pipestem Creek	430	0.2
Lick Creek	535	0.2
Island Creek	255	0.1
East River	1,095	0.4
Wolf Creek	6,975	2.6
Rich Creek	4,885	1.8
Indian Creek	2,825	1.1
b. Minor tributaries & immediate drainage (non-point load) -	2,470	0.9
c. Known domestic STP's -		
Blacksburg	22,680	8.6
Christiansburg	8,910	3.4
Radford	13,610	5.1
Radford Army Amm. Plt.	6,150	2.3
Pearisburg	4,990	1.9
Narrows	3,400	1.3
Rich Creek	820	0.3
Red Sulfur PSD	865	0.3
Appalachian Power Co.	170	<0.1
Bluefield -		
East Plant	1,170	0.4
West Plant	18,525	7.0
Athens	1,475	0.6
Glenwood PSD (all ponds) -	4,285	1.6
Princeton	15,995	6.0
Bluewell PSD	1,360	0.5
Matoaka	905	0.3
d. Septic tanks* -	20	<0.1

* Estimate based on 55 lakeshore dwellings, one park, and one campsite; see Working Paper No. 175.

Source	kg P/ yr	% of total
e. Known industrial -		
Radford Army Ammo Plt.		
AB-line	2,175	0.8
C-line	155	<0.1
TNT plant	495	0.2
Celanese Fibers Co.	?	-
f. Direct precipitation* -	145	<0.1
Total	264,385	100.0

2. Outputs -

   Lake outlet - New River 237,910

3. Net annual P accumulation - 26,475 kg.

* See Working Paper No. 175.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/yr	% of total
a. Tributaries (non-point load) -		
New River	3,950,550	51.3
Little Bluestone River	19,205	0.2
Bluestone River	232,545	3.0
Pipestem Creek	13,880	0.2
Lick Creek	16,630	0.2
Island Creek	14,355	0.2
East River	37,665	0.5
Wolf Creek	226,650	2.9
Rich Cree[illegible]	31,455	0.4
Indian Creek	131,990	1.7
b. Minor tributaries & immediate drainage (non-point load) -	94,155	1.2
c. Known domestic STP's -		
Blacksburg	68,020	0.9
Christiansburg	26,720	0.3
Radford	40,810	0.5
Radford Army Amm. Plt.	26,895	0.3
Pearisburg	13,135	0.2
Narrows	10,205	0.1
Rich Creek	2,465	<0.1
Red Sulfur PSD	1,185	<0.1
Appalachian Power Co.	510	<0.1
Bluefield -		
East Plant	7,975	0.1
West Plant	39,385	0.5
Athens	2,810	<0.1
Glenwood (all ponds) -	12,855	0.2
Princeton	42,100	0.5
Bluewell PSD	4,080	<0.1
Matoaka	2,720	<0.1
d. Septic tanks* -	690	<0.1

* Estimate based on 55 lakeshore dwellings, one park, and one campsite; see Working Paper No. 175.

Source	kg N/yr	% of total
e. Known industrial -		
Radford Army Amm. Plt.		
AB-line	2,568,985	33.4
C-line	9,895	0.1
TNT plant	37,420	0.5
Celanese Fibers Co.	?	-
f. Direct precipitation* -	8,905	0.1
Total	7,696,845	100.0

2. Outputs -

Lake outlet - New River	7,503,630

3. Net annual N accumulation - 193,215 kg.

D. Mean Annual Non-point Nutrient Export by Subdrainage Area:

Tributary	kg P/km^2/yr	kg N/km^2/yr
New River	13	437
Little Bluestone River	6	214
Bluestone River	17	247
Pipestem Creek	8	268
Lick Creek	10	300
Island Creek	7	399
East River	6	191
Wolf Creek	12	392
Rich Creek	37	239
Indian Creek	6	275

* See Working Paper No. 175.

E. Yearly Loadings:

In the following table, the existing phosphorus loadings are compared to those proposed by Vollenweider (Vollenweider and Dillon, 1974). Essentially, his "dangerous" loading is one at which the receiving water would become eutrophic or remain eutrophic; his "permissible" loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic loading would be considered one between "dangerous" and "permissible".

Note that Vollenweider's model may not be applicable to water bodies with short hydraulic retention times.

	Total Phosphorus		Total Nitrogen	
	Total	Accumulated	Total	Accumulated
grams/m^2/yr	32.05	3.21	933.0	23.4

Vollenweider phosphorus loadings ($g/m^2/yr$) based on mean depth and mean hydraulic retention time of Bluestone Reservoir:

"Dangerous" (eutrophic loading)	5.00
"Permissible" (oligotrophic loading)	2.50

V. LITERATURE REVIEWED

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VI. APPENDICES

APPENDIX A

LAKE RANKINGS

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	5404	TYGART RESERVOIR	450
2	5402	LAKE LYNN RESERVOIR	350
3	5403	SUMMERSVILLE RESERVOIR	299
4	5401	BLUESTONE RESERVOIR	100

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	SOC-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
5401	BLUESTONE RESERVOIR	0.074	1.080	473.700	14.900	11.800	0.018
5402	LAKE LYNN RESERVOIR	0.006	0.490	403.222	4.733	14.800	0.003
5403	SUMMERSVILLE RESERVOIR.	0.011	0.660	363.818	6.242	14.600	0.006
5404	TYGART RESERVOIR	0.006	0.430	378.667	1.178	14.700	0.005

2/

Reproduced from best available copy.

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500- MEAN SEC	MEAN CHLORA	15- MIN DO	MEDIAN DISS ORTHO P	INDEX NO
5401	BLUESTONE RESERVOIR	0 (0)	0 (0)	0 (0)	0 (0)	100 (3)	0 (0)	100
5402	LAKE LYNN RESERVOIR	83 (2)	67 (2)	33 (1)	67 (2)	0 (0)	100 (3)	350
5403	SUMMERSVILLE RESERVOIR	33 (1)	33 (1)	100 (3)	33 (1)	67 (2)	33 (1)	299
5404	TYGART RESERVOIR	83 (2)	100 (3)	67 (2)	100 (3)	33 (1)	67 (2)	450

APPENDIX B

CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX C

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR WEST VIRGINA 3/25/75

LAKE CODE 5401 BLUESTONE RESERVOIR

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 11924.4

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
5401A1	11924.4	235.31	222.57	256.27	234.46	167.64	121.48	100.52	95.43	90.90	119.50	124.59	153.48	159.86
5401A2	9039.1	182.36	156.03	195.95	184.06	136.77	105.34	89.48	93.16	92.31	119.50	112.13	119.21	132.09
5401B1	89.9	2.12	2.83	3.54	2.41	1.70	0.57	0.42	0.23	0.14	0.20	0.71	1.56	1.36
5401C1	940.2	17.41	25.49	35.40	22.37	15.29	5.80	3.82	2.69	1.98	2.69	5.52	13.31	12.58
5401D1	51.8	1.27	1.70	2.12	1.42	0.99	0.42	0.23	0.14	0.08	0.11	0.42	0.85	0.81
5401E1	55.4	1.42	1.84	2.27	1.42	1.13	0.42	0.25	0.14	0.08	0.14	0.42	0.99	0.87
5401F1	36.0	0.85	1.13	1.42	0.99	0.71	0.25	0.17	0.11	0.06	0.08	0.28	0.57	0.55
5401G1	197.1	2.55	3.11	3.40	1.98	1.42	0.99	0.57	0.85	0.42	0.42	0.71	1.84	1.51
5401H1	577.6	11.89	15.43	18.69	13.17	9.34	5.10	4.25	3.54	2.12	2.55	3.82	8.21	8.14
5401J1	131.1	1.70	2.27	2.27	1.42	1.13	0.71	0.42	0.71	0.28	0.28	0.57	1.27	1.08
5401K1	479.1	6.37	7.65	8.21	4.81	3.40	2.27	1.42	1.42	0.85	0.99	1.84	4.67	3.64
5401ZZ	326.3	7.79	6.09	7.08	6.37	4.53	3.40	2.83	2.55	2.55	3.26	3.40	4.25	4.50

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 11924.4
SUM OF SUB-DRAINAGE AREAS = 11923.6
TOTAL FLOW IN = 2008.81
TOTAL FLOW OUT = 1922.15

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
5401A1	7	73	114.97	29	81.84				
	9	73	60.88	23	49.84				
	10	73	81.84	21	45.31				
	11	73	110.44	11	79.29				
	12	73	308.65	14	254.85				
	1	74	413.43	18	232.20				
	2	74	274.11	14	180.94	28	217.76		
	3	74	297.33	14	518.20	28	212.09		
	4	74	286.00	21	147.25				
	5	74	184.06	23	161.41				
	6	74	168.49	24	99.11				
5401A2	7	73	97.41	28	114.40				
	8	73	124.59	17	108.17				
	9	73	60.03	23	41.06				
	11	73	69.66	14	52.39				
	12	73	217.19	13	139.89				
	1	74	257.40	3	393.60	27	254.29		
	2	74	210.39	14	161.69	28	184.06		
	3	74	202.47	14	246.07	28	179.81		
	4	74	244.66	18	190.57				
	5	74	166.79	23	126.29				
	6	74	141.58	24	73.06				

TRIBUTARY FLOW INFORMATION FOR WEST VIRGINA 3/25/75

LAKE CODE 5401 BLUESTONE RESERVOIR

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
5401B1	7	73	0.51	29	0.37				
	8	73	0.59	19	1.05				
	9	73	0.17	23	0.14				
	10	73	0.48	21	0.37				
	11	73	1.27	11	0.54				
	12	73	2.38	14	2.04				
	1	74	3.57	18	1.81				
	2	74	2.15	14	1.47	28	1.81		
	3	74	3.68	14	5.52	28	2.18		
	4	74	1.95	21	1.13				
	5	74	1.61	23	1.61				
	6	74	0.91	24	0.65				
5401C1	7	73	5.38	29	3.85				
	8	73	6.14	19	10.85				
	9	73	1.81	23	1.42				
	10	73	3.06	21	1.50				
	11	73	15.77	11	3.94				
	12	73	29.45	14	33.41				
	1	74	46.44	18	16.74				
	2	74	20.81	14	16.45	28	14.81		
	3	74	43.04	14	83.53	28	16.57		
	4	74	17.81	21	9.46				
	5	74	19.45	23	11.30				
	6	74	9.77	24	4.53				
5401D1	7	73	0.28	29	0.21				
	8	73	0.34	19	0.59				
	9	73	0.10	23	0.08				
	10	73	0.28	21	0.21				
	11	73	0.74	11	0.31				
	12	73	1.36	14	1.19				
	1	74	2.04	18	1.05				
	2	74	1.25	14	0.85	28	1.05		
	3	74	2.27	14	3.11	28	1.25		
	4	74	1.13	21	0.65				
	5	74	0.93	23	0.91				
	6	74	0.51	24	0.37				
5401E1	7	73	0.31	28	0.31				
	8	73	0.37	30	0.16				
	10	73	0.17	13	0.14				
	11	73	0.79	14	0.28				
	12	73	1.47	13	0.74				
	1	74	2.21	3	3.82	27	2.52		
	2	74	1.33	14	0.91	28	1.13		
	3	74	2.27	14	3.40	28	1.36		
	4	74	1.22	18	0.85				
	5	74	0.99	23	0.99				
	6	74	0.57	13	0.40				

TRIBUTARY FLOW INFORMATION FOR WEST VIRGINA 3/25/75

LAKE CODE 5401 BLUESTONE RESERVOIR

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
5401F1	7	73	0.20	28	0.19				
	8	73	0.23	30	0.10				
	10	73	0.11	13	0.09				
	11	73	0.51	14	0.18				
	12	73	0.96	13	0.48				
	1	74	1.44	3	2.49	27	1.61		
	2	74	0.88	14	0.59	28	0.74		
	3	74	1.47	14	2.27	28	0.88		
	4	74	0.79	18	0.57				
	5	74	0.65	23	0.65				
	6	74	0.37	13	0.26				
5401G1	7	73	1.13	28	1.13				
	8	73	1.56	30	0.85				
	10	73	0.85	13	0.57				
	11	73	2.83	14	0.85				
	12	73	7.08	13	1.56				
	1	74	8.50	3	12.74	27	5.66		
	2	74	4.81	14	3.11	28	3.68		
	3	74	8.50	14	16.99	28	3.96		
	4	74	3.96	18	2.55				
	5	74	3.68	23	2.55				
	6	74	1.98	13	0.99				
5401H1	7	73	3.54	28	3.74				
	8	73	5.07	17	3.96				
	10	73	2.94	13	1.95				
	11	73	7.59	14	2.46				
	12	73	22.43	13	5.78				
	1	74	27.33	3	43.04	27	32.28		
	2	74	15.80	14	9.09	28	12.94		
	3	74	22.94	14	47.86	28	13.98		
	4	74	12.54	18	6.48				
	5	74	10.53	23	7.36				
	6	74	5.24	13	3.11				
5401J1	7	73	0.82	28	0.85				
	8	73	1.16	17	0.91				
	10	73	0.68	13	0.45				
	11	73	1.76	14	0.57				
	12	73	5.10	13	1.33				
	1	74	6.23	3	9.91	27	7.36		
	2	74	3.62	14	2.10	28	2.97		
	3	74	5.27	14	11.02	28	3.28		
	4	74	2.89	18	1.50				
	5	74	2.44	23	1.70				
	6	74	1.22	13	0.71				

TRIBUTARY FLOW INFORMATION FOR WEST VIRGINA 3/25/75

LAKE CODE 5401 BLUESTONE RESERVOIR

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
5401K1	7	73	2.83	29	2.55				
	8	73	4.25	19	5.38				
	9	73	1.70	23	1.42				
	10	73	2.44	21	1.13				
	11	73	6.29	11	2.49				
	12	73	18.41	14	13.59				
	1	74	22.65	18	10.62				
	2	74	13.11	14	7.53	28	10.73		
	3	74	19.03	14	39.64	28	11.55		
	4	74	10.42	21	5.47				
	5	74	8.75	23	6.12				
	6	74	4.36	24	2.44				

APPENDIX D

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 75/03/25

540101
37 38 20.0 080 53 17.0
BLUESTONE RESERVOIR
54089 WEST VIRGINIA

11EPALES
3

2111202
0040 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/03	14	00 0000	12.7		14	140	8.00	46	0.100	0.400	0.910	0.017
	14	00 0004	12.7	9.6		138	7.90	47	0.100	0.400	0.890	0.017
	14	00 0015	12.5	9.5		138	7.90	47	0.090	0.400	0.880	0.017
	14	00 0036	12.5	9.5		138	7.90	46	0.080	0.400	0.880	0.017
73/07/18	12	20 0000	26.4	6.4	36	170	7.80	56	0.090	0.300	1.100	0.022
	12	20 0005	26.2	6.1		175	7.60	57	0.100	0.200	1.100	0.024
	12	20 0010	25.8			176						
	12	20 0015	25.3	6.1		171	7.50	59	0.120	0.200	0.920	0.028
	12	20 0020	25.2			171						
	12	20 0025	24.8			171						
	12	20 0030	24.7			172						
	12	20 0035	24.0	4.3		189	7.40	66	0.340	0.600	0.660	0.029
73/09/26	15	30 0000	24.3		36	175	9.50	61	0.040	0.600	1.210	0.089
	15	30 0005	23.5	10.6		176	8.90	62	0.040	0.300	1.310	0.088
	15	30 0015	23.4	10.0		175	8.70	58	0.050	0.300	1.340	0.089
	15	30 0025	22.0	7.2		155	7.90	54	0.100	0.400	0.980	0.021
	15	30 0034	21.7	1.2		210	7.50	76	0.430	0.800	0.748	0.028

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/03	14	00 0000	0.074	1.2
	14	00 0004	0.075	
	14	00 0015	0.068	
	14	00 0036	0.090	
73/07/18	12	20 0000	0.063	41.9
	12	20 0005	0.056	
	12	20 0015	0.065	
	12	20 0035	0.073	
73/09/26	15	30 0000	0.096	26.2
	15	30 0005	0.047	
	15	30 0015	0.044	
	15	30 0025	0.035	
	15	30 0034	0.052	

STORET RETRIEVAL DATE 75/03/25

540102
37 34 06.0 080 52 53.0
BLUESTONE RESERVOIR
54089 WEST VIRGINIA

11EPALES 2111202
3 0008 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/03	14 30	0000	12.1		18	130	7.00	42	0.080	0.400	1.000	0.018
	14 30	0005	12.7	11.2		130	7.50	43	0.090	0.400	1.000	0.016
73/07/18	11 35	0000	24.0		15	144	7.80	50	0.100	0.200	1.100	0.028
	11 35	0005		7.8			7.80	50	0.070	0.200K	1.200	0.020
	11 35	0010	23.8			152						
	11 35	0015	23.7	7.3		147	7.80	50	0.070	0.200K	1.200	0.025
73/09/26	15 00	0000	25.3	10.0	36	186	9.00	70	0.040	0.700	0.400	0.018
	15 00	0005	24.7	8.2		186	8.60	72	0.040	0.500	0.430	0.019
	15 00	0015	23.4	6.0		166	7.70	66	0.170	0.400	0.740	0.015

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/03	14 30	0000	0.071	1.8
	14 30	0005	0.089	
73/07/18	11 35	0000	0.069	10.8
	11 35	0005	0.074	
	11 35	0015	0.078	
73/09/26	15 00	0000	0.097	21.5
	15 00	0005	0.090	
	15 00	0015	0.053	

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/03/25

S40103
37 30 03.0 080 50 15.0
BLUESTONE RESERVOIR
54089 WEST VIRGINIA

11EPALES
3

2111202
0010 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/03	14 55	0000			18	125	7.70	43	0.070	0.400	0.980	0.018
	14 55	0004	12.1	9.9		123	7.80	42	0.080	0.500	0.990	0.014
73/09/26	14 45	0000	25.0	9.0	36	226	8.80	65	0.040	0.500	2.700	0.024

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/03	14 55	0000	0.096	1.5
	14 55	0004	0.077	
73/09/26	14 45	0000	0.102	21.5

STORET RETRIEVAL DATE 75/03/25

540104
37 26 43.0 080 50 57.0
BLUESTONE RESERVOIR
54089 WEST VIRGINIA

11EPALES
3

2111202
0010 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/03	15 30	0000			18	120	7.90	41	0.090	0.200	0.920	0.019
73/09/26	14 25	0000	24.1	9.2	36	213	8.00	63	0.050	0.600	2.420	0.030

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/03	15 30	0000	0.092	2.1
73/09/26	14 25	0000	0.085	20.5

APPENDIX E

TRIBUTARY and WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 75/03/25

5401A1
37 39 00.0 080 53 16.0
NEW RIVER
54003 7.5 HINTON
O/BLUESTONE RES
W END OF RT 3 BRDG AT BELLEPOINT
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/29	10 30		1.160	0.230	0.031	0.020	0.055
73/09/23	08 50		1.200	0.540	0.046	0.023	0.070
73/10/21	08 50		1.100	0.500	0.048	0.032	
73/11/11	10 30		1.360	0.650	0.094	0.024	0.045
73/12/14	13 30		0.570	0.200	0.044	0.008	0.070
74/01/18	16 30		1.260	0.500	0.068	0.024	0.055
74/02/14	14 00		1.200	0.800	0.045	0.025	0.040
74/02/28	11 30		0.970	0.200	0.020	0.025	0.050
74/03/14	13 40		1.180	0.300	0.020	0.020	0.045
74/03/28	11 00		1.010	0.700	0.030	0.020	0.032
74/04/21	11 15		0.960	0.500	0.065	0.022	0.030
74/05/23	12 15		0.780	0.300	0.050	0.015	0.025
74/06/24	11 00		1.010	0.300	0.045	0.005K	0.045

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/03/25

5401A2
37 20 25.0 080 45 29.0
NEW RIVER
54 7.5 NARROWS
I/BLUESTONE RES
US 460 BRDG AT BLUFF CITY
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/28	13 01		0.810	0.270	0.028	0.018	0.050
73/08/17	14 05		1.200	0.360	0.036	0.024	0.055
73/09/23	12 50		2.000	0.375	0.034	0.017	0.040
73/11/14	13 30		0.750	0.250	0.022	0.021	0.060
73/12/13	12 05		1.400	0.300	0.016	0.020	0.050
74/01/03	14 15		0.970	0.400	0.044	0.012	0.055
74/01/27	11 00		0.980	0.700	0.048	0.020	0.050
74/02/14	13 50		1.180	0.100K	0.010	0.020	0.035
74/02/28	16 15		1.200	0.200	0.010	0.015	0.035
74/03/14	13 27		1.260	0.500	0.055	0.015	0.050
74/03/28			1.120	0.300	0.020	0.015	0.035
74/04/18	14 50		0.960	0.400	0.050	0.020	0.020
74/05/23	14 50		1.360	0.500	0.025	0.012	0.040
74/06/24	13 15		1.680	1.300	0.055	0.005	0.025

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/03/25

540181
37 36 16.0 080 58 35.0
LITTLE BLUESTONE RIVER
54 7.5 PIPESTEM
T/BLUESTONE RES
BANK BESIDE RD .5 DOWNSTREM OF SUCK CR
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/29	12	05	0.105	0.720	0.023	0.006	0.010
73/08/19	12	00	0.070	0.210	0.025	0.005K	0.020
73/09/23	09	35	0.029	0.190	0.044	0.006	0.010
73/10/21	09	35	0.010K	0.200	0.023	0.015	
73/11/11	09	45	0.115	0.200	0.033	0.005K	0.005K
73/12/14	12	45	0.288	0.100	0.024	0.006	0.020
74/01/18	14	30	0.310	0.100K	0.020	0.005K	0.010
74/02/14	10	30	0.352	0.300	0.015	0.010	0.015
74/02/28	12	00	0.288	0.200	0.020	0.010	0.020
74/03/14	13	05	0.260	0.200	0.025	0.005K	0.010
74/03/28	10	30	0.276	0.200	0.020	0.010	0.010
74/04/21	15	30	0.200	0.500	0.045	0.005K	0.005K
74/05/23	12	00	0.204	0.200	0.015	0.005K	0.020
74/06/24	12	30	0.140	0.100K	0.035	0.005K	0.005

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/03/25

5401C1
37 32 15.0 081 00 30.0
BLUESTONE RIVER
54 7.5 FLAT TOP
T/BLUESTONE RES
BANK BELO TRAMWAY TO LODG PIPESTEM ST PK
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/24	14 00		0.670	0.280	0.013	0.132	0.175
73/08/19	12 40		0.770	0.870	0.030	0.100	0.260
73/09/23	10 35		0.378	0.540	0.029	0.280	0.310
73/10/21	10 45		0.420	0.400	0.022	0.260	0.435
73/11/11	15 05		0.630	0.275	0.023	0.128	0.145
73/12/14	14 30		0.320	0.100K	0.016	0.008	0.015
74/01/18	15 30		0.704	0.600	0.056	0.074	0.120
74/02/14	12 00		0.620	0.100	0.020	0.055	0.090
74/02/28	12 30		0.280	0.300	0.010	0.040	0.075
74/03/14	12 20		0.500	0.300	0.010	0.035	0.092
74/03/28	09 30		0.570	0.500	0.010	0.020	0.090
74/04/21	09 30		0.160	0.300	0.025	0.032	0.035
74/05/23	12 30		0.500	0.200	0.025	0.052	0.105
74/06/24	11 10		0.470	0.100	0.010	0.090	0.140

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/03/25

540101
37 35 30.0 080 54 55.0
PIPESTEM CREEK
54 7.5 PIPESTEM
T/BLUESTONE RES
BANK BESIDE RT 20 5 MI NE OF PIPESTEM
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/29	15 30		0.190	0.170	0.010	0.015	0.020
73/08/19	15 00		0.100	0.280	0.022	0.012	0.030
73/09/23	12 45		0.077	0.210	0.023	0.011	0.015
73/10/21	12 35		0.046	0.650	0.033	0.022	
73/11/11	14 20		0.168	0.250	0.048	0.008	0.008
73/12/14	10 30		0.080	0.100	0.008	0.012	0.020
74/01/18	14 00		0.300	0.800	0.096	0.012	0.020
74/02/14	13 30		0.340	0.100K	0.010	0.010	0.010
74/02/28	15 00		0.152	0.600	0.030		0.020
74/03/14	10 30		0.216	0.100	0.005	0.005K	0.010
74/03/28	13 15		0.252	0.600	0.025	0.005	0.010
74/04/21	10 30		0.136	0.300	0.030	0.005K	0.015
74/05/23	12 30		0.200	0.600	0.030	0.010	0.025
74/06/24	11 30		0.240	0.100K	0.015	0.005	0.015

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/03/25

5401E1
37 28 40.0 080 54 40.0
LICK CREEK
54 7.5 LEWONA
T/BLUESTONE RES
RD BRDG .5 MI S OF COMMUNITY OF LICK CR
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/28	10 30		0.046	0.200	0.023	0.007	0.015
73/08/30	15 30		0.010K	0.540	0.023	0.012	0.052
73/10/13	10 35		0.042	0.350	0.026	0.007	0.025
73/11/14	11 20		0.035	0.150	0.010	0.007	0.035
73/12/13	14 45		0.320	0.100K	0.016	0.005K	0.010
74/01/03	10 45		0.580	0.400	0.040	0.006	0.015
74/01/27	09 20		0.570	0.500	0.036	0.008	0.010
74/02/14	10 57		0.390	0.400	0.030	0.010	0.010
74/02/28	14 30		0.380	0.200	0.010	0.005	0.015
74/03/14	10 35		0.600	0.500	0.045	0.005K	0.010
74/03/28	09 30		0.320	0.400	0.020	0.005	0.010
74/04/18	12 28		0.160	0.300	0.035	0.005K	0.005
74/05/23	16 40		0.176	0.400	0.030	0.007	0.055
74/06/13	11 30		0.076	0.100K	0.025	0.005K	0.005K

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/03/25

5401F1
37 27 35.0 080 54 15.0
ISLAND CREEK
54 7.5 LERONA
T/BLUESTONE RES
RD BRDG .5 MI S OF COMMUNITY OF HILLTOP
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/28	11 05		0.050	0.140	0.014	0.006	0.010
73/08/30	16 00		0.050	0.180	0.024	0.008	0.020
73/10/13	11 00		0.014	0.320	0.022	0.005K	0.020
73/11/14	11 40		0.030	0.200	0.029	0.007	0.025
73/12/13	14 25		0.390	0.100	0.008	0.005K	0.005
74/01/03	11 15		0.830	0.700	0.052	0.005K	0.015
74/01/27	09 45		0.890	0.900	0.040	0.005K	0.015
74/02/14	10 40		0.528	0.100	0.010	0.005	0.015
74/02/28	14 45		0.510	0.300	0.020	0.005	0.015
74/03/14	10 40		0.924	0.300	0.020	0.005K	0.015
74/03/28	09 43		0.400	0.100	0.015	0.010	0.010
74/04/18	12 36		0.144	0.900	0.055	0.010	0.010
74/05/23	16 15		0.124	0.300	0.020	0.005	0.025
74/06/13	16 00		0.120	1.800	0.110	0.005K	0.005

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/03/25

5401G1
37 21 16.0 080 52 13.0
E RIVER
54 7.5 NARROWS
T/BLUESTONE RES
RD BRDG 1 MI E OF WILLOWTON
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/28	14 10		0.270	0.150	0.014	0.011	0.030
73/08/30	16 30		0.090	0.180	0.058	0.005K	0.020
73/10/13	13 45		0.056	0.300	0.024	0.008	0.020
73/11/14	12 50		0.240	0.175	0.017	0.012	0.015
73/12/13	13 30		0.640	0.200	0.012	0.016	0.020
74/01/03	12 50		0.810	0.800	0.044	0.016	0.045
74/01/27	11 52		0.730	1.000	0.044	0.012	0.035
74/02/14	14 25		0.430	0.300	0.020	0.010	0.015
74/02/28	15 30		0.528	0.500	0.020	0.010	0.020
74/03/14	11 30		0.900	0.200	0.010	0.005	0.035
74/03/28	10 43		0.500	0.300	0.010	0.010	0.015
74/04/18	13 35		0.400	0.300	0.040	0.005	0.005
74/05/23	15 30		0.400	0.700	0.035	0.015	0.030
74/06/13	14 45		0.270	0.100K	0.025	0.005	0.010

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/03/25

5401M1
37 20 00.0 080 48 45.0
WOLF CREEK
54 7.5 NARROWS
T/BLUESTONE RES
RT 649 BRDG AT NARROWS
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/24	12 02		0.610	0.180	0.011	0.007	0.025
73/08/17	14 20		0.570	0.100K	0.033	0.013	0.025
73/10/13	12 10		0.300	0.230	0.029	0.005K	0.015
73/11/14	13 30		0.470	0.150	0.017	0.007	0.040
73/12/13	16 30		0.740	0.100K	0.012	0.005K	0.005
74/01/03	14 45		0.810	0.300	0.024	0.008	0.035
74/01/27	10 45		0.540	0.300	0.016	0.008	0.030
74/02/14	13 30		0.700	0.100K	0.010	0.010	0.070
74/02/24	15 52		0.650	0.400	0.020	0.005	0.017
74/03/14	11 53		0.570	0.500	0.015	0.005K	0.045
74/03/28	11 05		0.800	0.300	0.025	0.020	0.020
74/04/18	14 30		0.528	0.500	0.020	0.005K	0.015
74/05/23	15 00		0.440	0.100	0.020	0.005	0.025
74/06/13	13 40		0.380	1.000	0.050	0.005K	0.015

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/03/25

5401J1
37 24 28.0 080 48 40.0
RICH CREEK
54 7.5 PETERSTOWN
T/BLUESTONE RES
BRDG NEAR END OF RD AT NW EDGE PETERSTWN
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/28	13 40		0.410	0.160	0.014	0.255	0.290
73/08/17	15 00		0.470	0.370	0.042	0.480	0.580
73/10/13	13 15		0.273	0.320	0.022	0.410	0.440
73/11/14	16 55		0.273	0.150	0.032	0.190	0.250
73/12/13	12 45		0.760	0.500	0.048	0.036	0.125
74/01/03	13 45		0.860	0.200	0.020		0.050
74/01/27	11 30		0.710	0.700	0.040	0.016	0.035
74/02/14	12 40		0.616	0.100K	0.020	0.045	0.070
74/02/28	16 37		0.730	0.500	0.020	0.035	0.065
74/03/14	13 10		0.810	0.400	0.020	0.010	0.040
74/03/28	12 00		0.672	0.300	0.025	0.045	0.055
74/04/18	15 08		0.390	0.500	0.025	0.062	0.070
74/05/23	14 30		0.480	0.500	0.045	0.070	0.095
74/06/13	12 50		0.380	1.400	0.105	0.115	0.155

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/03/25

5401K1
37 30 58.0 080 46 13.0
INDIAN CREEK
54 7.5 FORESTHILL
T/BLUESTONE RES
RT 12 BRDG NEAR RED SUFPHUR SPRINGS
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/07/29	09 45		0.240	0.940	0.046	0.011	0.035
73/08/19	10 20		0.470	0.990	0.064	0.035	0.115
73/09/23	13 55		0.010K	0.460	0.024	0.006	0.035
73/10/21	13 30		0.017	0.400	0.018	0.019	
73/11/11	11 30		0.600	0.950	0.060	0.008	0.020
73/12/14	13 45		0.470	0.200	0.012	0.008	0.025
74/01/18	13 30		0.800	0.500	0.056	0.012	0.020
74/02/14	12 10		0.660	3.700	0.085	0.010	0.015
74/02/28	11 00		0.400	0.200	0.010	0.010	0.020
74/03/14	15 30		0.450	0.200	0.010	0.005K	0.015
74/03/28	12 34		0.740	0.700	0.030	0.010	0.020
74/04/21	10 45		0.270	0.600	0.030	0.005K	0.015
74/05/23	11 15		0.570	0.300	0.025	0.010	0.035
74/06/24	14 00		0.552	0.200	0.025	0.005	0.035

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/01/06

5401AA PR5401AA P003200
37 20 15.0 080 44 07.0
TOWN OF PEARISBURG
54 7.5 PEARISBURG
T/BLUESTONE RESERVOIR
NEW RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/03/08	11	00							
CP(T)-			0.480	32.000	16.500	7.000	18.000	0.298	0.295
74/03/08	15	00							
74/04/15	13	00							
CP(T)-			0.080	31.000	14.500	6.800	17.700		0.250
74/04/15	15	45							
74/05/24	10	30							
CP(T)-			0.120	40.000	17.000	8.500	18.000	0.286	0.295
74/05/24	15	15							
74/06/24	10	50							
CP(T)-			0.052	44.420	21.000	9.800	19.000	0.250	0.280
74/06/24	15	00							
74/07/19	11	00							
CP(T)-			0.160	38.000	19.000	7.350	12.000	0.270	0.280
74/07/19	16	00							
74/08/14	10	30							
CP(T)-			0.040	31.000	13.000	6.700	12.000	0.269	0.260
74/08/14	16	00							
74/09/18	11	00							
CP(T)-			0.080	44.500	22.000	9.300	15.000	0.268	0.270
74/09/18	16	00							
74/10/15	11	00							
CP(T)-			0.080	40.000	19.500	7.250	13.000	0.245	0.250
74/10/15	16	00							
74/11/12	11	00							
CP(T)-			0.080	43.000	23.000	7.200	12.500	0.241	0.250
74/11/12	16	00							
74/12/13	11	00							
CP(T)-			0.640	40.500	14.500	6.100	15.000	0.248	0.250
74/12/13	15	00							
75/01/14	10	30							
CP(T)-			0.880	36.500	11.500	5.100	9.450	0.255	0.260
75/01/14	15	30							
75/02/13	11	00							
CP(T)-			1.520	23.000	3.500	3.500	6.800	0.268	0.270
75/02/13	16	15							

STORET RETRIEVAL DATE 76/01/06

S401AA PR5401AA P003200
37 20 15.0 080 44 07.0
TOWN OF PEARISBURG
54 7.5 PEARISBURG
T/BLUESTONE RESERVOIR
NEW RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/03/17 CP(T)-	10 30								
75/03/17	15 00		1.600	15.000	4.400	3.700	6.100	0.280	0.260

STORET RETRIEVAL DATE 75/03/25

5401AC AS5401AC P000060
37 22 07.0 080 51 45.0
APPALACIAN POWER COMPANY
54 7.5 NARROWS
T/BLUESTONE RESERVOIR
NEW RIVER
11EPALES
4
2141204
0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/03/07	11 00								
CP(T)-									
74/03/07	16 00		2.240	5.200	0.600	4.100	5.400		
74/04/15	11 00								
CP(T)-									
74/04/15	15 00		6.800	3.600	0.750	2.350	3.000		
74/05/09	11 00								
CP(T)-									
74/05/09	16 00		0.160	8.000	3.000	1.650	1.780		
74/06/07	11 00								
CP(T)-									
74/06/07	15 00		1.560	1.500	0.420	1.500	1.750		
74/07/23	11 00								
CP(T)-									
74/07/23	16 00		9.300	4.400	0.740	2.100	2.400		
74/08/07	11 00								
CP(T)-									
74/08/07	16 00		5.700	1.200	0.330	1.750	2.100		
74/09/13	11 00								
CP(T)-									
74/09/13	16 00		3.120	1.400	0.540	2.400	2.500		
74/10/07	11 00								
CP(T)-									
74/10/07	16 00		10.400	2.200	0.420	2.300	2.700		
74/12/27	11 30								
CP(T)-									
74/12/27	15 30		9.800	5.700	1.330	2.500	2.500		
75/01/10	11 00								
CP(T)-									
75/01/10	15 00		8.600	4.100	0.770	2.200	2.800		

STORET RETRIEVAL DATE 76/01/06

5401AD NUS401AD P0000000
37 18 45.0 080 19 00.0
RADFORD ARMY AMMUNITION PLANT
54 MONTGOMERY CO
T/BLUESTONE RESERVOIR
NEW RIVER (A-B LINE)
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/04/09	08 00								
CP(T)-			109.000	1.000K	0.160	0.110	0.120	17.500	18.700
74/04/10	08 00								
74/05/21	08 00								
CP(T)-			140.000	3.800		0.130	0.130	17.600	17.100
74/05/22	08 00								
74/06/04	08 00								
CP(T)-			104.000	1.200	0.115	0.050K	0.050K	17.800	17.700
74/06/05	08 00								
74/07/23	08 00								
CP(T)-			120.000	1.500	0.078	0.067	0.190	12.600	12.800
74/07/24	08 00								
74/08/27	09 00								
CP(T)-			106.000	1.600	0.200	0.130	0.170	16.900	14.500
74/08/28	09 00								
74/09/24	09 00								
CP(T)-			141.000	1.600	0.380	0.110	0.150	12.100	10.500
74/09/25	09 00								
74/10/22	09 00								
CP(T)-				3.200	0.150	0.210		12.900	12.700
74/10/23	09 00								
74/11/26	09 00								
CP(T)-			185.700	3.000	0.360	0.100	0.100K	12.200	11.200
74/11/27	09 00								
74/12/30	09 00								
CP(T)-			163.500	2.200	0.480	0.056	0.100K	13.100	11.300
74/12/31	09 00								
75/01/28	09 00								
CP(T)-			185.500	1.000K	0.175	0.070	0.143	10.500	10.900
75/01/29	09 00								
75/02/25	09 00								
CP(T)-			360.000	2.600	0.140	0.080K	0.110	4.910	6.450
75/02/26	09 00								
75/03/25	09 30								
CP(T)-			50.000L	1.000K	0.180	0.080K	0.250	5.270	5.070
75/03/26	09 30								

K VALUE KNOWN TO BE
LESS THAN INDICATED

L ACTUAL VALUE IS KNOWN TO BE
GREATER THAN VALUE GIVEN

STORET RETRIEVAL DATE 76/01/06

5401AD NO5401AD P000000*
37 10 45.0 080 19 00.0
RADFORD ARMY AMMUNITION PLANT
54 MONTGOMERY CO
T/BLUESTONE RESERVOIR
NEW RIVER (A-B LINE)
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/04/22	09 00								
CP(T)-				0.500K	0.150			5.440	5.360
75/04/23	09 00								

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/01/06

5401AE NO5401AE P000000*
37 10 47.0 080 09 01.0
RADFORD ARMY AMMUNITION PLANT
54 MONTGOMERY CO
T/BLUESTONE RES
NEW RIVER (C LINE)
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/04/09	08	00							
CP(T)-			2.640	1.500	0.088	0.055	0.059	1.490	0.916
74/04/10	08	00							
74/05/21	08	00							
CP(T)-			4.200	1.000	0.330	0.140	0.270	0.753	0.960
74/05/22	08	00							
74/06/04	08	00							
CP(T)-			3.700	1.000K	0.077	0.050K	0.050K	0.796	0.756
74/06/05	08	00							
74/07/23	08	00							
CP(T)-			7.700	1.000K	0.120	0.050K	0.050K	0.756	0.754
74/07/24	08	00							
74/08/26	09	00							
CP(T)-			3.120	18.000	0.300	0.060	0.066	0.762	0.750
74/08/27	09	00							
74/09/23	09	00							
CP(T)-			3.120	2.900	0.250	0.094	0.100	1.240	0.945
74/09/24	09	00							
74/10/21	09	00							
CP(T)-			4.160	1.200	0.150	0.074		1.340	1.240
74/10/22	09	00							
74/11/25	09	00							
CP(T)-			2.320	1.000K	0.080K	0.058	0.100K	1.420	1.350
74/11/26	09	00							
74/12/23	09	00							
CP(T)-			0.960	1.000K	0.084	0.140	0.100K	1.360	1.480
74/12/24	09	00							
75/01/27									
CP(T)-			3.350	1.000K	0.330	0.050	0.100K	0.707	1.200
75/01/28									
75/02/24	09	00							
CP(T)-			2.680	0.680	0.096	0.080K	0.100K	0.752	1.160
75/02/25	09	00							
75/03/24	09	30							
CP(T)-			13.100	1.000K	0.080K	0.080K	0.100K	1.470	1.500
75/03/25	09	30							

A VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/01/12

5401AE N05401AE P000000*
37 10 47.0 080 09 01.0
RADFORD ARMY AMMUNITION PLANT
54 MONTGOMERY CO
T/BLUESTONE RES
NEW RIVER (C LINE)
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/04/21 CP(T)- 75/04/22	09 00			1.800	0.130	0.088	0.160	1.260	1.390

STORET RETRIEVAL DATE 75/03/25

5401AF NO5401AF P000000*
37 10 40.0 080 19 00.0
RADFORD ARMY AMMUNITION PLANT
54 MONTGOMERY CO
T/BLUESTONE RES
NEW RIVER (TNT PLANT)
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/04/16	08 00								
CP(T)-			5.800	1.000K	0.110	0.073	0.140	3.440	3.250
74/04/17	08 00								
74/05/14	08 00								
CP(T)-			5.400	1.000K	0.130	0.010	0.050K	5.000	5.000
74/05/15	08 00								

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 76/01/06

5401AG TF5401AG P001300
37 10 45.0 080 19 03.0
RADFORD ARMY AMMUNITION PLANT
54 MONTGOMERY CO
T/BLUESTONE RES
NEW RIVER (SEWAGE)
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/04/18	08 00								
CP(T)-			17.000	25.000	7.900	8.900	10.000	0.562	0.358
74/04/19	06 00								
74/05/29	08 00								
CP(T)-			26.400	25.000	7.300	11.000	11.000	0.533	0.450
74/05/30	08 00								
74/06/26	08 00								
CP(T)-			34.000	19.000	4.900	8.700	9.600	0.485	0.548
74/06/27	06 00								
74/07/24	08 00								
CP(T)-			14.000	26.000	9.600	8.400	9.800	0.526	0.500
74/07/25	06 00								
74/08/27	08 00								
CP(T)-			4.600	47.000	18.000	10.000	14.000	0.369	0.350
74/08/28	06 00								
74/09/24	24 00								
CP(T)-			0.800	47.000	26.000	6.100	14.000	0.353	0.394
74/09/25	24 00								
74/10/22	12 00								
CP(T)-				45.000	22.000	12.000		0.488	0.489
74/10/23	12 00								
74/11/26	12 00								
CP(T)-			28.800	37.000	15.700	7.600	8.750	0.412	0.425
74/11/27	12 00								
74/12/25	09 00								
CP(T)-			2.080	17.000	6.300	4.100	4.400	0.398	0.472
74/12/26	09 00								
75/01/28	24 00								
CP(T)-			1.750	28.000	12.450	1.440	7.700	0.436	0.448
75/01/29	24 00								
75/02/25	12 00								
CP(T)-			2.125	34.000	0.460	0.290	9.480	0.440	0.569
75/02/26	12 00								
75/03/25	12 00								
CP(T)-			4.190	35.000	13.600	9.000	9.500	0.443	0.456
75/03/26	12 00								

STORET RETRIEVAL DATE 76/01/06

5401AG TF5401AG P001300
37 10 45.0 080 19 03.0
RADFORD ARMY AMMUNITION PLANT
54 MONTGOMERY CO
T/BLUESTONE RES
NEW RIVER (SEWAGE)
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/04/22	09 00								
CP(T)-									
75/04/23	09 00		8.000	37.500	14.000	11.500	12.000	0.352	0.402

STORET RETRIEVAL DATE 75/03/25

5401CB TF5401CB P023000
37 15 00.0 081 18 00.0
BLUEFIELD/WEST PLANT IN VIRGINIA
54 250 BLUEFIELD
T/BLUESTONE RESERVOIR
BLUESTONE RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/08/15	11 00								
CP(T)-			4.700	6.000	0.260	2.300		2.960	2.620
73/08/15	16 00								
73/09/16	11 00								
CP(T)-			13.600	5.400	0.275	6.600	8.300	1.630	2.290
73/09/16	16 00								
73/10/17	09 00								
CP(T)-			9.500	5.600	0.380	7.000	8.600	1.650	2.180
73/10/17	11 00								
73/11/15	09 00		9.500	8.500	0.310	6.500	8.400	1.780	1.990
73/12/16	00 00								
CP(T)-			10.000	4.700	0.130	4.100	6.700	1.470	1.180
73/12/16	02 00								
74/01/15	09 00		8.000	7.300	0.048	3.050	4.900	1.760	1.620
74/02/15	09 00		6.800	3.600	0.720	4.000	4.700	2.520	2.820
74/03/15	09 00		5.520	2.600	0.080	1.325	1.550	1.040	2.500
74/04/16	09 00		7.800	1.700	0.210	3.400	5.400	2.500	2.500
74/05/15	09 00		6.200	4.600	0.230	2.400	4.650	2.750	2.440
74/06/17	09 00		10.600	7.000	0.860	5.730	8.000	1.480	2.000
74/07/17	09 00		4.400	5.400		4.100	5.600	2.480	2.220
74/08/15	09 00								
CP(T)-			7.800	6.500	0.290	5.750	7.600	2.120	2.380
74/08/15	21 00								

STORET RETRIEVAL DATE 75/03/25

5401GA TF5401GA P004300
37 15 00.0 081 15 00.0
BLUEFIELD EAST PLANT
54 250 BLUEFIELD
T/BLUESTONE RESERVOIR
EAST RIVER/NEW RIVER
11EPALS 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/08/15	11 30		6.400	5.800	0.260	2.790	3.300	0.400	0.400
73/09/17	09 45		10.100	4.100	0.130	5.100	5.600		
73/10/15	11 30		11.200	3.000	0.058	4.800	5.400		
73/11/15	11 30		11.000	7.300	0.630	6.000	6.000		
74/01/16	10 30		5.500	15.000	1.320	3.200	5.100		
74/02/15	12 30		7.000	7.000	1.900	3.600	4.500		
74/03/18	14 00		4.500	3.900	0.094	1.765	2.300	0.005	0.005
74/06/17	11 00		11.800	5.700	0.630	3.100	3.900	0.400	
74/07/15	11 00		12.600	20.000	0.450	4.000	4.600	0.340	0.360
74/08/22	11 00		12.000	8.100	1.850	4.000	4.700	0.330	0.340
74/09/17	11 00			4.600	0.110	3.700	4.500	0.340	0.350
74/11/15	11 00		9.800	3.500	0.170	3.300	3.725	0.360	0.340

STORET RETRIEVAL DATE 75/03/25

5401JA TF5401JA P001800
37 24 00.0 080 48 22.0
RED SULPHUR PSD
54 7.5 PETERSTOWN
T/BLUESTONE RESERVOIR
RICH CREEK
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/08/14	13 00		0.340	2.970	0.190	2.700	6.500	0.150	0.152
73/09/13	11 00		2.060	1.700	0.138	5.420	5.700	0.160	0.152
73/10/12	13 00		2.300	1.550	0.026	6.940	7.600	0.150	0.150
73/11/13	11 00		2.520	1.300	0.110	5.400	6.100	0.150	0.153
73/12/14	10 30		3.100	3.000	0.090	0.840	2.000	0.250	0.250
74/01/14	10 30		3.200	10.000	0.370	0.910	1.150	0.200	0.200
74/02/14	14 00		3.360	3.100	0.440	1.920	3.100	0.172	0.170
74/03/13	13 30		3.300	1.000K	0.200	0.810	1.450	0.250	0.172
74/04/15	11 30		1.920	1.100	0.100	2.300	2.500	0.172	0.172
74/05/13	15 00		2.620	1.200	0.105	1.750	3.300	0.200	0.200
74/06/13	14 20		0.232	1.000	0.035	4.450	4.700	0.108	0.115
74/07/15	13 15		0.080	4.200	0.050K	3.800	4.250	0.108	0.150

K VALUE KNOWN TO BE
LESS THAN INDICATED

39

STORET RETRIEVAL DATE 75/03/25

5401JB PR5401JB P000725
37 23 00.0 080 49 27.0
TOWN OF RICHCREEK
54 7.5 PETERSTOWN
T/BLUESTONE RES
RICH CREEK TO NEW RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/03/15	15 00		0.120	11.000		0.100	5.600		
74/04/15			0.480	24.000	5.100	5.900	14.500	0.060	0.060
74/04/25			0.480			5.900			
74/05/15	15 30		0.440	24.000	4.500	4.600	10.000		
74/06/18	14 30		0.080	26.000	4.800	5.000	9.500		
74/07/19	11 00		0.080	29.000	10.500	8.200	10.500		
74/09/16	11 00		0.220	24.000		5.650	9.250		
74/11/18	13 00		0.240	31.000	9.800	5.600	10.500		
74/12/16	11 30		1.120	20.000	0.580	2.800	4.700		
75/01/15	09 35		1.520	17.000	0.170	0.050K	4.400		

K VALUE KNOWN TO BE
LESS THAN INDICATED

STONET RETRIEVAL DATE 75/03/25

5401XA TFS401XA P011000
37 23 05.0 081 04 55.0
PRINCETON
54 7.5 ATHENS
T/BLUESTONE RESERVOIR
BRUSH CREEK/BLUESTONE RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/08/20	07 30								
CP(T)-			0.920	17.600	6.600	5.300		2.000	1.200
73/08/20	14 30								
73/09/17	08 00								
CP(T)-			0.790	19.000	11.900	9.840	12.000	1.000	1.000
73/09/17	08 00								
73/10/29	08 00								
CP(T)-			0.560	18.000	5.400	4.000	6.300	2.000	1.100
73/10/29	15 00								
73/11/13	07 30								
CP(T)-			0.200	27.000	9.900	9.300	12.000	2.000	2.000
73/11/13	14 30								
73/12/17	08 00								
CP(T)-			0.830	11.500	1.600	2.200	3.400	1.900	1.000
73/12/17	15 00								
74/01/14	08 00								
CP(T)-			0.840	7.600	3.120	2.240	3.600	2.300	2.500
74/01/14	16 00								
74/02/04	08 30								
CP(T)-			0.240	10.000	2.760	2.300	3.500	2.300	2.700
74/02/04	15 30								
74/03/12	07 30								
CP(T)-			0.480	7.400		0.059	1.600	4.000	2.500
74/03/12	15 30								
74/04/19	06 30								
CP(T)-			0.480	17.000	6.000	5.600	7.700	1.000	2.000
74/04/19	14 30								
74/05/06	06 30								
CP(T)-			0.480	13.500	4.000	2.900	4.300	2.000	2.000
74/05/06	14 30								
74/06/11	06 30								
CP(T)-			0.200	22.000	7.700	7.400	10.000	1.000	1.700
74/06/11	14 30								
74/07/22	08 00								
CP(T)-			0.320	29.000	12.000	7.350	10.000	2.700	1.750
74/07/22	15 00								

STORET RETRIEVAL DATE 75/03/25

S401XB PUS401XB P002200
37 20 12.0 081 10 30.0
GLENWOOD PSD POND AB(GREEN VALLE
54 250 BLUEFIELD
T/BLUESTONE RESERVOIR
BRUSH CR/BLUESTONE RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/08/23	13 50		0.017	11.500	0.880	3.000	11.500		
73/09/24	10 10		0.070	12.000	1.350	6.650	7.600		
73/10/25			0.150	16.500	0.380	4.800	8.800		
73/11/21	16 30		0.190	10.500	0.350	4.700	6.200		
73/12/21	11 15		0.340	8.000	0.230	3.990	5.400		
74/01/22	10 30		0.120	3.600	0.190	2.200	3.500		
74/02/26	13 30		0.240	4.300	0.200	1.350	2.300		
74/04/10	10 00		0.120	2.400	0.360	1.100	1.600		
74/06/26	13 30		0.040	11.500		2.300	4.500		
74/07/29	11 30		0.080	11.000	0.085	2.600	4.000		

STORET RETRIEVAL DATE 75/03/25

5401XC P05401XC P000800
37 20 12.0 081 10 30.0
GLENWOOD PSD POND C (GREENVALLEY
54 250 BLUEFIELD
T/BLUESTONE RESERVOIR
BRUSH CREEK/BLUESTONE RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/08/23	13 20		0.046	14.000	0.430	6.300	14.000		
73/09/24	11 40		0.070	10.000		7.500	8.500		
73/10/25			0.022	19.500	0.830	9.000	12.000		
73/11/27	15 30		0.010K	17.300	1.470	7.400	9.000		
73/12/21	11 00		0.180	17.000	1.470	6.500	8.300		
74/01/22	11 00		0.080	11.500	0.780	5.000	6.200		
74/02/26	16 15		0.080	10.000	1.450	4.900	5.500		
74/04/10	15 00		0.280	7.500	0.340	3.000	4.500		
74/06/28	10 00		0.069	13.000	0.190	4.100	5.700		
74/07/29	10 00		0.080	12.000		2.400	3.900		

K VALUE KNOWN TO BE
LESS THAN INDICATED

STONET RETRIEVAL DATE 75/03/25

5401XD PD5401XD P000320
37 20 12.0 081 10 30.0
GLENWOOD PSD G1 (GREEN VALLEY)
54 250 BLUEFIELD
T/BLUESTONE RESERVOIR
BRUSH CREEK/BLUESTONE RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/08/23	11 00		0.035	9.900	2.260	5.600	9.900		
73/09/24	12 00		0.260	19.800	1.000	6.500	8.800		
73/10/25			0.060	11.000	0.470	6.500	8.000		
73/11/27	13 30		0.160	12.000	0.240	5.600	6.300		
73/12/21	09 15		0.160	9.300	0.200	5.200	7.100		
74/01/22	11 30		0.120	7.700	0.140	3.520	4.200		
74/02/26	15 00		0.040	4.200	0.082	2.600	3.000		
74/04/10	15 30		0.096	6.400	0.060	2.750	4.200		
74/06/28	11 15		0.016	13.500	0.540	4.500	6.500		
74/07/29	09 30		0.040	16.000	0.056	3.200	5.400		

STORET RETRIEVAL DATE 75/03/25

5401XE PUS401XE P000240
37 20 12.0 081 10 30.0
GLENWOOD POND G2 GREENVALLEY
54 250 BLUEFIELD
T/BLUESTONE RESERVOIR
BRUSH CREEK/BLUESTONE RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/08/23	11 25		0.076	10.500	0.820	4.960	10.500		
73/09/24	11 10		0.070	14.700	2.310	7.700	8.900		
73/10/25			0.030	14.000	1.150	7.000	9.200		
73/11/21	13 45		0.290	12.000	0.240	4.700	6.200		
73/12/21	10 35		0.390	9.600	0.750	2.730	4.000		
74/01/22	10 00		0.160	7.000	0.360	2.300	3.200		
74/02/26	14 45		0.120	8.400	0.770	3.000	4.000		
74/04/10	16 00		0.080	8.400	0.580	2.300	3.500		
74/06/28	10 45		0.014	11.630	0.690	4.700	6.150		
74/07/24	09 30		0.040	12.000	0.920	4.100	5.750		

-57

STORET RETRIEVAL DATE 75/03/25

5401XF PDS401XF P000220
37 20 12.0 081 10 30.0
GLENWOOD PSD POND NGREEN VALLEY
54 250 BLUEFIELD
T/BLUESTONE RESERVOIR
BRUSH CREEK/BLUESTONE RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/08/23	10	15	0.042	10.000	0.460	2.600	10.000		
73/09/24	10	30	0.050	12.000	0.400	5.900	7.800		
73/10/25			0.014	18.500	1.200	7.100	9.300		
73/11/27	14	15	0.060	11.500	2.940	4.800	5.800		
73/12/21	10	30	0.090	8.100	1.540	3.590	4.700		
74/01/22	11	30	0.120	6.600	0.960	3.200	3.725		
74/02/26	14	30	0.240	5.200	0.320	1.850	3.180		
74/04/10	16	30	0.120	6.400	0.180	1.650	3.600		
74/06/26	13	00	0.069	17.000	0.850	4.200	6.100		
74/07/24	08	00	0.040	9.500	1.100	3.500	4.500		

STORET RETRIEVAL DATE 75/03/25

5401YA AS5401YA P002900
37 25 20.0 081 23 05.0
ATHENS
54 7.5 ATHENS
T/BLUESTONE RESERVOIR
LAUREL CR/BRUSHY CR/BLUESTONE RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/08/23	08	30	9.300		0.076		5.270	0.163	0.177
73/09/24	08	30							
CP(T)-			3.100	1.250	0.500	7.700	7.700	0.240	0.234
73/09/24	16	30							
73/10/23	11	00							
CP(T)-			4.900	2.000	0.170	8.700	8.900	0.190	0.220
73/10/23	16	00							
73/11/23	08	30							
CP(T)-			10.000	0.500K	0.076	7.200	7.500	0.141	0.220
73/11/23	16	00							
73/12/21	08	30							
CP(T)-			5.000	2.900	0.052	1.380	1.950	0.633	0.250
73/12/21	16	00							
74/01/23	08	30							
CP(T)-			0.320	9.500	1.280	5.500	6.100	0.263	0.324
74/01/23	12	30							
74/02/21	08	30							
CP(T)-			7.700	1.000	0.096	2.400	2.600	0.439	0.280
74/02/21	16	03							
74/03/21	08	30							
CP(T)-			4.900	1.400	0.150	2.150	2.337	0.424	0.445
74/03/21	16	00							
74/04/21	08	00							
CP(T)-			1.840	7.000	0.280	6.300	6.900	0.196	0.240
74/04/21	16	00							
74/05/20	08	30							
CP(T)-			11.200	1.100	0.074	5.000	5.200	0.136	0.170
74/05/20	16	00							
74/06/19	08	30							
CP(T)-			10.900	3.400	0.055	4.500	4.800	0.152	0.170
74/06/19	16	00							
74/07/15	08	00							
CP(T)-			6.500	2.000	0.085	4.700	6.000	0.096	0.125
74/07/15	16	00							

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/03/25

5401ZA
37 25 30.0 081 15 00.0
MATOAKA
54 25U BLUEFIELD
T/BLUESTONE RESERVOIR
*IDEMOUTH CREEK/BLUESTONE R
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
74/04/15	11 00								
CH(T)-			15.200	1.800	0.140	6.000	7.200	0.050	0.050
74/04/15	16 00								